sufficient to break windows, blow down signs and awnings, and to damage frail structures.

9th–10th.—*Michigan:* The 9th and 10th were periods of very great thunderstorm activity. One person was killed by lightning, and two were drowned by the capsizing of a boat during a squall at Detroit about 7.30 p. m. of the 9th. The greatest destruction by wind appears to have been at Saginaw, where the loss to structures was probably over $30,000. A large number of barns throughout the State were struck by lightning and consumed.

10th.—Portions of *Indiana* and *Ohio* were visited by severe thunderstorms. In Rockcreek township, Wells County, Ind., a funnel cloud was seen moving to the southeast. Trees and small buildings were blown down over a path about 660 feet wide. *South Dakota:* Brown County, a storm of wind, rain, and hail moved southeast over a path 3½ to 4 miles wide. It is said there was a funnel cloud high in the air.

11th.—Thunderstorms occurred in *Michigan*, western *Missouri*, and northern *Ohio;* also on the night of the 11–12th in northwestern *Indiana*.

13th.—*Minnesota:* Corn and live stock were damaged by hail south of Marshall, Lyon Co. *Iowa:* There was some damage to orchards and corn in Dallas and Hamilton counties. *Pennsylvania:* Heavy rains in western Pennsylvania caused creeks and smaller streams to rise very rapidly. At Dehaven four persons were drowned in the flood waters.

15th.—Thunderstorms were general throughout *Iowa*, and portions of *Illinois*, *Nebraska*, and *Minnesota*.

16th.—*California:* Heavy rains fell in the southern part of the State; railroad property and bridges damaged. *Missouri:* Severe thunderstorms occurred in the vicinity of St. Louis.

18th.—*Massachusetts:* A small whirlwind struck a big wooden freight shed which was being constructed by the railroad company in Boston and caused it to collapse, burying 35 men among the timbers. One man was killed and nine badly injured.

20th.—*South Dakota:* Violent wind and hail storm occurred near Chamberlain and Kimball, in Brule County. It extended from northwest to southeast leveling all the vegetation in its path in a strip about 2 miles wide; lasted about 20 minutes. Property loss to buildings $4,000 or $5,000. White River Valley also suffered from a hail and wind storm, which destroyed the crops.

22d.—*Missouri:* On the 22d severe local storms occurred in many of the northern and a few of the southern counties, doing a great deal of damage to corn, orchards, and hay and grain stacks. The severest storms reported in Daviess, Linn, Pulaski, and Knox counties, where considerable damage was done to buildings. Severe local storms and torrential rains also occurred in *Illinois*, *Iowa*, and *Indiana* on the same date.

23d.—*Tennessee:* Newport and Fayetteville, Tenn., were visited by severe thunderstorms on the afternoon of this date.

27th.—*Texas:* Galveston was visited by a high wind from the northeast on the evening of this date. Property loss $5,000.

Total casualties by wind, 16; casualties by lightning, 80.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperature is given for each station in Table II, for voluntary observers. Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution of the observed monthly mean* temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the Rocky Mountain Plateau Region, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean temperatures* were: Yuma, 90.0; Phœnix, 88.6; San Antonio, 84.8; Palestine, 84.3; Abilene, Galveston, Key West, 84.0; Oklahoma, 83.2; New Orleans, 83.0. The lowest mean temperatures were: Point Reyes Light, 56.0; Tatoosh Island, 57.4; Port Angeles, 58.2; San Francisco, 59.5; Eastport, 59.6; Eureka, 59.9. Among the Canadian stations the highest were: Kingston, 68.4; Toronto, 66.3; Montreal, 66.1. The lowest were: Banff, 54.0; Father Point, 55.2; Edmonton, 56.4; White River, 56.8.

As compared with the normal for August the mean temperature for the current month was in excess throughout the United States east of the Rocky Mountains and in Washington and Oregon; it was deficient in California, the Central Plateau, and northern Slope, and Canada. The greatest excesses were: Fort Smith, 5.9; Topeka, 4.4; Meridian, 4.2; Dodge City, 4.1; Eureka, 4.0; Atlanta and Chattanooga, 3.9; Memphis, Oklahoma, and Wichita, 3.8; Mobile, Knoxville, Green Bay, and Milwaukee, 3.5.

Considered by districts the mean temperatures for the current month show departures from the normal as given in Table I. The greatest positive departures were: West Gulf, 2.7; middle Slope, 3.1; southern Slope (Abilene), 3.3. The greatest negative departure was: Middle Plateau, 1.2.

The *years of highest and lowest mean temperatures* for August are shown in Table I of the REVIEW for August, 1894. The mean temperature for the current month was the highest on record at: Fort Smith, 84.6; Palestine, 84.3; Abilene, 84.0; Oklahoma, 83.2; Pensacola, 82.7; Jupiter, 82.2; Wichita, 81.6; Columbia, 81.2; Chattanooga and Atlanta, 80.4; Hatteras and Dodge City, 79.4; Cape Henry, 78.8; Raleigh, 78.7; Milwaukee, 71.6; Green Bay, 69.9; Eureka, 59.9; Tatoosh Island, 57.4; Point Reyes Light, 56.0. The mean temperature for the current month was not the lowest on record at any regular station of the Weather Bureau.

The *maximum and minimum temperatures* of the current month are given in Table I. The highest maxima were: 113, Yuma (13th); 108, Phœnix (13th); 107, Fort Smith, (3d); 106, Shreveport (6th), Wichita, (20th). The lowest maxima were: 69, Point Reyes Light (29th); 72, Tatoosh Island (23d), Eureka (31st), and San Francisco (18th); 77, Port Angeles (23d); 78, Eastport (11th). The highest minima were: 71, Yuma (6th), Key West (31st), and Jupiter (frequently); 70, Corpus Christi (30th), Galveston (27th), New Orleans (9th), and Pensacola (1st). The lowest minima were: 34, Moorhead (31st); 37, Northfield (29th); 38, Havre (11th) and Williston (26th).

The *years of highest maximum and lowest minimum temperatures* are given in the last four columns of Table I of the current REVIEW. During the present month the maximum temperatures were the highest on record at: Fort Smith, 107; Wichita and Shreveport, 106; Topeka and Little Rock, 105; Oklahoma, 104; Kansas City and Concordia, 103; Palestine and Pueblo, 102; Columbia, 101; St. Paul, Vicksburg, and Meridian, 100; Minneapolis and Raleigh, 99; Milwaukee and Baltimore, 98; Parkersburg and Pensacola, 97; Albany and Jupiter, 95; New Haven, 94; Alpena, 93; Vineyard Haven, 92; Woods Hole, 87; Block Island and Nantucket, 86. The

minimum temperatures were the lowest on record at: Denver, 43; Vineyard Haven and Amarillo, 52; Augusta, 58; Savannah, 61; Jacksonville, 64; Tampa, 66.

The greatest daily range of temperature and data for computing the extreme and mean monthly ranges are given for each of the regular Weather Bureau stations in Table I. The largest values of the greatest daily ranges were: Williston, Miles City, and Idaho Falls, 48; Bismarck and Huron, 47; Moorhead and Carson City, 46; Rapid City, 45. The smallest values were: Hatteras, 14; Block Island, Woods Hole, Jupiter, Point Reyes Light, and Eureka, 17; Nantucket, Key West, Port Eads, Corpus Christi, and San Francisco, 18.

Among the *extreme monthly ranges* the largest were: Huron, 61; Moorhead, 60; Bismarck, 58; Pierre and Sioux City, 57; Williston and La Crosse, 56. The smallest values were: Key West, 19; Point Reyes Light and San Francisco, 20; Eureka, 21; Corpus Christi and Jupiter, 22; Port Eads, 23; Hatteras, Galveston, and Tatoosh Island, 24.

The *accumulated monthly departures* from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average accumulated departures are given in the third column for comparison with the departures of current conditions of vegetation from the normal condition.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
New England	+ 0.5	+ 0.1	Florida Peninsula	−11.4	− 1.4
Middle Atlantic	+ 4.8	+ 0.6			
South Atlantic	+10.2	+ 1.3			
East Gulf	+ 1.7	+ 0.2			
West Gulf	+11.3	+ 1.4			
Ohio Valley and Tenn	+11.2	+ 1.4			
Lower Lake	+11.3	+ 1.4			
Upper Lake	+23.1	+ 2.9			
North Dakota	+ 7.4	+ 0.9			
Upper Mississippi	+21.9	+ 2.7			
Missouri Valley	+21.4	+ 2.7			
Northern Slope	+ 9.4	+ 1.2			
Middle Slope	+25.0	+ 3.1			
Abilene (southern Slope)	+24.7	+ 3.1			
Southern Plateau	+ 5.5	+ 0.7			
Middle Plateau	+ 1.8	+ 0.2			
Northern Plateau	+15.9	+ 2.0			
North Pacific	+ 2.6	+ 0.3			
Middle Pacific	+ 1.6	+ 0.2			
South Pacific	+ 5.0	+ 0.6			

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effects of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Measurements of evaporation within the thermometer shelters are difficult to make so as to be intercomparable at temperatures above and below freezing, and may be replaced by computations based on the wet-bulb temperatures. The absolute amount of evaporation from natural surfaces not protected from wind, rain, sunshine, and radiation, are being made at a few experimental stations and will be discussed in special contributions.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. A complete expression for the relation between atmospheric conditions and nervous sensations has not yet been obtained.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was heaviest, 6 to 11 inches, in the northern portion of the Florida Peninsula, and nearly as heavy in a portion of western Indiana and northeastern Kansas. It was less than 0.5 in central Montana, central Idaho, central Washington and Oregon, and nearly all of California and Nevada.

Details as to *excessive precipitation* are given in Tables XII and XIII.

The *diurnal variation*, as shown by tables of hourly means of the total precipitation, deduced from self-registering gauges kept at the regular stations of the Weather Bureau, is not now tabulated.

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was in excess in the lower Lake Region and St. Lawrence Valley, the Plateau Region and Pacific Coast, portions of Iowa and adjacent States. Elsewhere it was deficient, and especially in the Atlantic and Gulf States. The large excesses were: Alpena, 3.3; Montreal, 3.2; Meridian, 2.6; Port Huron, 2.2. The large deficits were: Galveston, 5.2; Wilmington, 5.0; Hatteras, 4.9; Chattanooga, 4.3; Kittyhawk, 4.2; Norfolk, 4.1.

The total accumulated monthly departures from normal precipitation from January 1 to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
Lower Lake	+ 2.50	110	New England	− 5.00	83
North Dakota	+ 1.10	107	Middle Atlantic	− 2.80	91
Upper Mississippi	+ 0.80	103	South Atlantic	− 7.30	81
Southern Plateau	+ 0.30	105	Florida Peninsula	− 0.20	99
Middle Plateau	+ 3.10	138	East Gulf	− 7.00	83
Northern Plateau	+ 0.10	101	West Gulf	− 9.70	67
North Pacific	+ 4.60	113	Ohio Valley and Tenn	− 3.50	89
Middle Pacific	+ 2.80	115	Upper Lakes	− 2.20	90
			Missouri Valley	− 0.20	99
			Northern Slope	− 0.10	99
			Middle Slope	− 2.50	86
			Abilene (southern Slope)	− 6.20	66
			South Pacific	− 1.90	77

The *average departure* for each district is given in Table I. By dividing each by its respective normal the following corresponding percentages are obtained (precipitation is in excess when the percentage of the normal exceeds 100):

Above the normal: Lower Lake, 113; upper Lake, 114; middle Plateau, 446; northern Plateau, 433; north Pacific, 141; middle Pacific, 282.

Normal: South Pacific, 100.

Below the normal: New England, 60; middle Atlantic, 42; south Atlantic, 51; Florida Peninsula, 74; east Gulf, 64; west Gulf, 36; Ohio Valley and Tennessee, 81; North Da-